completed it would have been of great morphological value. To have done this would, however, have required more than the ten volumes that were regarded when the work was commenced as sufficient to complete it, and this independently of the Cryptogams.

Nor was Dr. Gray's all closet work: he diligently collected and observed over a considerable area of his native continent; along the Altantic coast from Canada to Florida; in the prairie and Rocky Mountain regions from Wyoming to the borders of New Mexico; in the great basin of Utah and Nevada; and along the Pacific coast from Oregon to St. Barbara.

With two notable exceptions, Dr. Gray confined his descriptive work to North American botany. These exceptions were: one, the fragmentary botany of Wilkes's South Pacific Exploring Expedition, with the execution of which he was intrusted, but which came to an end before it was half finished, for want of funds it is believed, after the publication of one quarto volume with a superb atlas of plates; the other is a memoir on the flora of Japan, founded chiefly on the collections made in that country by the United States North Pacific Exploring Expedition, which in point of originality and far-reaching results was its author's *opus magnum*. By a comparison of the floras of Japan with those of Eastern and Western America, and of these with one another, and all with the Tertiary floras of the Northern States, he drew in outline the history of the vegetation of the north temperate hemisphere in relation to its geography, from the Cretaceous period to the present time. It is a brilliant generalization, bearing the unmistakable stamp of genius.

It remains to allude to Gray's admirable defence of the doctrine of "the origin of species by natural selection," of which he, as one of a favoured few, had been fully informed by Darwin himself in 1857 ("Life and Letters," ii. 120), before it appeared in the Linnean Journal. His opinion, which was, from the first, cautiously favourable, but with reserve, soon ripened into a conviction of the truth of the principles involved. He alludes to it first in the concluding remarks to his essay on the flora of Japan, cited above, published in 1859, wherein he says that he is "disposed to admit that closely related species may, in many cases, be lineal descendants from a pristine stock." Again, in a letter to Mr. Darwin, dated early in July 1860, speaking in terms of highest praise of the "Origin," the following passages occur:—"The moment I understood your premisses, I felt sure that you had a real foundation to hold on. Well, if one admits your premisses, I do not see how he is to stop short of your conclusions, as a probable hypothesis at least." And, referring to his own review of it in *Silliman's Journal* (March 1860), he says:—"It naturally happens that my review of your book does not exhibit anything like the full force of the impression the book has made upon me. Under the circumstances, I suppose I do your theory more good here by bespeaking for it a fair and favourable consideration, and by standing non-committed as to its full conclusions, than I should if I announced myself a convert; nor could I say the latter with truth." It may be remarked here that just at this time a battle over species was raging in America, of which but faint echoes reached our shores. This was over the question of the single or multiple origin of species by creation. Gray was the champion of single creations, and, believing himself strongly supported by theological considerations, may well have felt that the further leap to evolution was one into the dark. Be this as it may, for the five years following the publication of the "Origin," Gray devoted himself to impressing upon the American public his opinion of its extraordinary merits by reviews in weekly and monthly periodicals, by lectures, and by discourses at scientific Academies. Latterly (in 1876) he collected many of these into a single volume which he entitled "Darwiniana." In it he defines his own position "as one who is scientifically, and in his own fashion, a Darwinian, philosophically a convinced theist, and religiously an acceptor of the 'creed commonly called the Nicene,' as the exponent of the Christian faith." From this position he never moved, and he subsequently delivered two lectures in further exposition of these views, at the Divinity School of Yale College. These were published in 1880, under the title of "Science and Religion." Finally, Mr. Darwin, whilst fully recognizing the different stand-points from which he and Gray took their departures, and their divergence of opinion in some important matters, regarded him as the naturalist who has most thoroughly gauged his work, and as a tower of strength to himself and his cause.

As a reviewer and bibliographer, Gray's labours must have been Herculean, and they were uninterrupted for nearly half a century. Even when on his travels in Europe, he was in the habit of contributing scientific notices to periodicals in the States. In 1836 he commenced writing reviews of botanical works, and notices of botanists, travellers, and collectors for *Silliman's Journal of Science and Arts*; and this function he continued to perform without intermission (latterly as a co-editor of that important periodical) till within a few days of his last illness. The number of these articles is truly astonishing, as is the knowledge they display of all branches of botany, Phænogamic and Cryptogamic. They are without exception just, sober, and discriminating, critical rather than laudatory, and eminently considerate in tone where censure is necessary. A selection from these, many being discussions full of original matter and suggestive observations, would be an instructive and acceptable contribution to the botanical literature of the century, and a meet tribute to their author's merits and memory.

Dr. Gray's figure and features were familiar in the scientific circles of this country; but for the information of others it may be stated that he was of spare, wiry figure, rather below the average height, his expression was keen and vivacious, and his movements, like his intellect, alert. He was a Foreign Fellow of the Royal and Linnean Societies, a correspondent of the Institute of France, and of the other Continental Academies, a Doctor of Laws of Oxford, Cambridge, and Edinburgh, and had served as President of the American Academy of Arts and Science, of the American Association for the Advancement of Science, and as a Regent of the Smithsonian Institution. Accompanied by Mrs. Gray he spent the summer of 1887 in Europe, chiefly in England, returning to Cambridge in September. In October he went to Washington on the affairs of the Smithsonian Institute. Soon after his return, on the 28th of November, he was struck with paralysis, from which he never rallied, and he died at the end of the following January. It is characteristic of him that his last letter, written in pencil immediately before his seizure to the contributor of these lines, was on the subject of a review for *Silliman's Journal* of Planchon's "Review of the Vines." Dr. Gray married in 1848, Jane, daughter of Judge Charles G. Loring, of Boston, who survives him. He left no family. An excellent medallion likeness of him in bronze was, on his seventy-fifth birthday, presented by his friends to Harvard College, Cambridge, U.S.

J. D. H.

NOTES.

On Tuesday evening a question was asked in the House of Commons, by Mr. Howorth, about the new regulations for the entrance examination at Woolwich. Mr. Howorth inquired whether these regulations were final and permanent, or only temporary. Mr. Stanhope, we regret to say, replied that the regulations are intended to be of permanent application. If that be so, it is the more necessary that a vigorous protest against the scheme should be made by those who have any true appreciation of the place which properly belongs to the study of science in education.

ON Tuesday the Committee of the Athenæum Club elected three new members in accordance with the rule which empowers the election of nine persons annually "of distinguished eminence in science, literature, or the arts, or for public services." The names of two of the new members are familiar to students of science—Major-General Donnelly, R.E., C.B., Secretary to the Department of Science and Art; and Prof. G. Carey Foster, F.R.S.

ONE of the leading native residents of Bombay, Sir Dinshaw Petit, has just given the Bombay Government a property valued at 300,000 rupees for the establishment of the proposed Technical Institute of Bombay.

WE regret to announce the death of Dr. Maximilian Schmidt, an eminent geologist and Director of the Zoological Gardens at Berlin. He was born at Frankfurt in 1834, and died at Berlin.

EMILE ROUSSEAU, the well-known French chemist, died on the 4th inst., at the age of seventy-three.

THE annual general meeting of the Fellows of the Royal Horticultural Society was held on Tuesday, Sir Trevor Lawrence, President of the Society, in the chair. The special Committee appointed to inquire into the working of the Society recommended that premises in No. 111 Victoria Street should be secured, and that for shows and meetings the Society should hire the drill-hall of the London Scottish Rifle Volunteers. The Committee also reported that they had under consideration "the construction of new by-laws intended to facilitate the carrying out of as complete a horticultural policy as possible—one in which all aspects and departments should be considered to the undue preponderance of none; but to the general advantage of all." After some discussion the Committee's recommendations were adopted. Several members of the Council having placed their resignation in the hands of the Fellows, it was resolved on the motion of Mr. Wilks, seconded by Mr. Veitch, to decline to accept their resignation, and they were then all formally re-elected, including Sir Trevor Lawrence, who was re-appointed President.

THE Calendar and General Directory of the Science and Art Department for 1888 has been issued.

THE curious fact was some time ago brought to light by Nahrwold that solid particles are ejected from a platinum wire glowing under the influence of an electric current, and form a metallic incrustation upon the walls of a glass tube by which the wire is surrounded. The cause of the emission of these solid particles of platinum has, however, until recently, remained a complete mystery. In the number of the *Annalen der Physik und Chemie* just received will be found an interesting paper by Dr. Alfred Berliner, who, in the course of a series of experiments upon the occlusion of gases by platinum and palladium, has discovered the source of this singular phenomenon. Thin strips of platinum, before being charged with the gas under experiment, were inclosed in a narrow glass tube, and freed from all occluded gas by being heated to redness, *in vacuo*, by the passage of a constant electric current for several hours. At the expiration of this time the metallic incrustation was invariably found when occluded gas had been evolved. On charging the strips with various quantities of any particular gas, the amount of incrustation formed after the complete expulsion of the gas in each experiment was found to vary in the same proportion. Hence it appears pretty clear that the evolution of gas is necessary for the emission of solid particles. This result is strongly confirmed by the fact that palladium, which has such a remarkable power of occluding gases, produces a similar incrustation much more readily and at a lower temperature. It appears probable that the action is merely mechanical; that we have, in fact, an immense number of microscopic volcanoes or solfataras, evolving the occluded gases with such energy that portions of the crater walls are detached and carried away by main force, like their brethren on the large scale, the scoriæ and lapilli, to distances very considerable in comparison with the size of the vents.

THE next meeting of the French Association for the Advancement of Science will be held in Oran from March 29 to April 3. Interesting excursions will be made to Biskra and other places.

AT the meeting of the Meteorological Society of France, on December 20, M. E. Lemoine was elected President for the ensuing year. M. Renou made a communication on the relations which exist between the annual number of solar spots and thunder-storms in various places, and concluded that the works hitherto published were far from sufficing to show any direct dependence between the two phenomena. At the meeting of January 11, M. Janssen, the retiring President, expressed his opinion of the necessity of organizing meteorological stations on a uniform plan at a certain number of stations, under the superintendence of professional and paid observers on whom a definite programme could be imposed, instead of having volunteer observers; this view was also supported by M. Renou. The latter gentleman also spoke of the importance of adopting a uniform cloud nomenclature, and announced that he would shortly present to the Society a work upon this subject. The general secretary presented a note from M. Garrigou-Lagrange on a new electrical anemometer giving the direction of the wind, and the horizontal and vertical components of its force (see NATURE, November 3, 1887, p. 18), and recommended its adoption at some coast stations.

THE Council of the Royal Meteorological Society, 30 Great George Street, Westminster, S.W., have appointed a Committee to collect observations on British hail- and thunder storms from volunteer observers. The objects which they hope to attain thereby are:—(1) A knowledge of the nature and causes of the different kinds of thunder-storms, their attention having been specially called to the subject by the great loss of life and property during the past summer. (2) A discovery of the localities where hail and thunder are most frequent and destructive. (3) If possible, to obtain an increased power of forecasting hail and thunder, whereby they hope that eventually damage to persons, stock, and property might be lessened. Forms and instructions will be sent to intending observers.

WE have received a "Brief Sketch of the Meteorology of the Bombay Presidency in 1886–87." It is by Mr. F. Chambers, Meteorological Reporter for Western India. Mr. Chambers points out that the meteorology of the year 1886–87 in the Bombay Presidency presents several features of special interest. There was a decided reappearance, for some time, of almost exactly the same unfavourable meteorological conditions which characterized the year 1877, when the rainfall in many parts of the Presidency was disastrously deficient. Fortunately, these unfavourable conditions did not last long enough to produce distress, for although a prolonged break in the rains caused considerable anxiety for a time, an excessive fall of rain late in the season brought relief, and on the whole the year was a favourable one.

A SEVERE earthquake occurred in Grenada on January 10. A rumbling noise was immediately followed by a slight shock and gentle lateral oscillations. Then came a very violent shock and vertical undulating oscillations. These were succeeded by gentle oscillations. The shock is supposed to have lasted from twenty to thirty seconds. Several houses in the town of

St. George's were so much damaged that they cannot be safely occupied. The walls of the St. David's Roman Catholic Church are so seriously injured that they will have to be taken down in some places and rebuilt. The sacristy was all but demolished; the basement wall of the presbytery was thrown down, and the building itself had to be propped up with posts. The Court House in the same parish sustained considerable injury. The tower of the Anglican Church in Grenville was cracked. During the succeeding week several mild shocks of earthquake were experienced in the island, the strongest of which occurred between 7 and 8 o'clock on the night of Sunday, January 15.

Dr. Forbes Watson's collection of commercial products, which was lately offered to the University of Aberdeen at the comparatively small price of £250, has been bought by Dr. Carnelley and his father, and presented to University College, Dundee. Prof. D'Arcy W. Thompson, at whose suggestion the purchase was made, writes to the *Dundee Advertiser:* "This excellent gift puts us at once in possession of a museum which is first-class of its kind, and of which town and College should be proud for ever. Dr. Forbes Watson is well known to many of the older men in Dundee for his knowledge of jute and all other commercial fibres. His works are standard on the subject. His collection was amassed with unrivalled opportunities and the highest technical skill. Great part of it was brought together as an official duty for the India Museum, and was presented by the Department to Dr. Forbes Watson when that Museum was broken up. It contains nearly 7500 samples. Between 700 and 800 of these are fibres, including textiles and paper-making materials. There are over 500 dyes and dye-stuffs, 500 oils and oil-seeds, 600 or 700 gums, resins, and guttas, nearly 2000 medicinal substances (may they be useful to us in the future), and more than as many samples of food-stuffs. The bulk of the collection is stored in bottles, filling fourteen cabinets, and there are also stands and cases for the display of specimens. Altogether the cases and bottles in which this great collection is stored represent a cost greater than the price which Dr. Forbes Watson now asks and receives."

The Batavia *Niewsblad* announces that the Government has decided upon establishing a bacteriological laboratory in that town. An institution for the pursuit of that special branch of study will be built immediately the funds for the purpose become available. The existing laboratory arrangements will be improved and extended, so as to admit of pathological and bacteriological investigations.

We are glad to learn from the *American Naturalist* that the project of a Marine Biological Laboratory on the New England coast is not languishing. Several thousand dollars have already been subscribed towards the erection of the necessary building and its equipment and maintenance. The Committee on the Laboratory have arranged a course of eight lectures, the proceeds of which are to be added to the fund.

Lieut. Niblack, U.S.N., has returned to Washington from a three-years' voyage to Southern Alaska, where he has been engaged on coast-survey duty. He has brought with him many photographs and objects which will be of interest to students of ethnology and anthropology. He devoted special attention to the totem posts of Southern Alaska. He says that in that country winter is the best season for ethnological studies. The natives are then at home, whereas in the summer they are often far inland.

Assistant Charles A. Schott, assistant in charge of the Computing Division of the United States Coast and Geodetic Survey, has addressed a letter to the Superintendent of his Bureau about the recent discovery, by Assistant G. Davidson, of records of the magnetic declination, A.D. 1714. He says that these records greatly increase our knowledge of the secular variation of the declination. *Science* gives the following account of the substance of M. Schott's letter:—"By means of these observations we are able to improve materially the expressions for San Blas and Magdalena Bay, to add the new station Cape San Lucas, and to make their influence felt as far north as San Diego and Santa Barbara. It is the range which is greatly improved; besides, the epoch of maximum declination is shifted in the right direction. Apart from the fact that a region of west declination is here for the first time observationally indicated on the Pacific coast, the power of the newly recovered declinations is due to the circumstance, that, as far as known, they cover a time when the needle was in or near a phase the opposite of the present one. For want of early observations, those previously collected for San Diego and Santa Barbara, Cal., were extremely difficult to handle; and, while it was not an easy matter to establish new expressions for these stations, their correctness, or rather applicability over the whole period of time the observations cover, is quite reassuring. He points out the desirability of new observations (either using funds yet available before July next, or providing funds to be used after that date) at San Diego, Santa Barbara, and Monterey, and states that these stations have received no attention for seven years. These observations are demanded to give greater precision to the computed variations on our charts."

A number of American geographers, all belonging to Washington, have incorporated the American National Geographical Society for a term of 100 years. The principal objects of the Society are to increase and diffuse geographical knowledge, to publish the Transactions of the Society, to publish a periodical magazine and other works relating to the science of geography, to dispose of such publications by sale or otherwise, and to acquire a library under the restrictions and regulations to be established by its by-laws.

The Commissioners of Public Schools of Baltimore, Md., deserve much credit for the efforts they are making to secure for the schools under their care important reforms which have always been advocated by students of sanitary laws. They lately resolved that the Mayor and City Council of Baltimore should be requested to authorize them to appoint an officer, to be known as the Sanitary Superintendent of Public Schools, whose duty would be: (1) to carefully examine all plans submitted for the construction of new school-houses, and suggest such modifications as may be necessary from a sanitary point of view; (2) to advise with the Commissioners with reference to necessary alterations in school-buildings to improve their hygienic condition; (3) to examine all text-books before adoption, in order that type, printing, or paper injurious to the eyesight of pupils may be avoided in selecting such books; (4) to satisfy himself, by personal examination if necessary, that all pupils admitted to the schools have been properly vaccinated, or are otherwise protected against small-pox; (5) to take such other measures, in conjunction with the Health Commissioner of the city, as may be necessary to prevent the spread of contagious diseases in, or through the medium of, the public schools; (6) to examine annually the eyesight of all children attending the public schools, and keep an accurate record of such examinations; (7) to report annually, or as often as may be required by the Commissioners, upon the sanitary condition of the schools, and of the pupils attending them, and to advise the Commissioners upon sanitary questions connected with schools whenever required; (8) to give instruction, by lectures or otherwise, to the teachers in the schools upon the elementary principles of school hygiene.

We have received the second volume of the Transactions of the Meriden (Conn., U.S.A.) Scientific Association. It contains, among other things, a valuable list, drawn up by Mr. Franklin Platt, of the birds of Meriden.

A THIRD edition of Mr. John Venn's "Logic of Chance" (Macmillan) has just been issued. The work has been rewritten, but the author explains that the alterations he has made do not imply any appreciable change of view on his part as to the foundations and province of probability. In the preface Mr. Venn mentions that he is engaged in preparing a work on inductive logic.

THE scientific writings of Jean Méry (1645–1722) have been brought together in a work edited by M. L. H. Petit, Assistant Librarian to the Medical Faculty of Paris. The work contains many contributions to biology which have not hitherto been generally known.

TOME III., Cahier I, of the "Mémoires de la Société des Sciences Physiques et Naturelles de Bordeaux," is devoted to a full bibliography of the Γ function.

WE have received the *Annuaire de l'Observatoire Royal de Bruxelles* for 1888, this being the fifty-fifth year of its publication. It contains the usual astronomical tables and data for the current year, and a mass of meteorological, geographical, financial, and other statistics. There is a complete list of the asteroids and comets discovered in the past year, with the elements of their orbits, and there is also an account of the state of solar activity in 1886. The tables of units and physical constants have been considerably extended, and a detailed account of electrical and magnetic measurements has been added. In addition there are, as usual, several scientific papers by the officials of the Observatory. M. Folie gives an account of his further investigations into the movements of the earth's axis, and in a subsequent article M. Niesten applies the correction for diurnal nutation to the various and widely differing determinations of the annual parallax of γ Draconis; the value obtained is $+0''\cdot086$. The important series of barometric observations, extending over a period of fifty years, are discussed at great length, and illustrated by diagrams.

MR. JOHN HEYWOOD, of Manchester and London, has issued a little book called "Flower-Land," by the Rev. R. Fisher. It is written in a simple style, and will no doubt be useful as an introduction to botany for children.

THE Perthshire Society of Natural Science has begun to issue Transactions and Proceedings. We have received the first part of the first volume. It contains notes on some rare birds lately placed in the Society's Museum, by Colonel H. M. Drummond Hay; mnium riparium, by R. H. Meldrum; some localities for Perthshire plants, by R. H. Meldrum; origin of the interbedded and intrusive volcanic rocks of Kinnoull Hill, by H. Coates; and the flora of the Woody Island, by W. Barclay.

MESSRS. KEGAN PAUL, TRENCH, AND CO. will publish immediately, in the "International Scientific Series," Sir J. William Dawson's new book entitled "The Geological History of Plants."

"A HISTORY OF PHOTOGRAPHY," by Mr. W. J. Harrison, will shortly be published. It is intended to serve as a practical guide to photography, and as an introduction to its latest developments.

A WORK containing a full account of the volcanic eruptions for the last sixty-four years on the island of Hawaii has been printed and will shortly be published in the city of Honolulu. The author is Mr. William Lowthian Green, at present Prime Minister of the kingdom of Hawaii, whose work on "The Vestiges of the Molten Globe" appeared in England some years ago, and has since attracted the attention of M. Lapparent and other Continental geologists. Mr. Green's new work will contain a complete tabular statement of the eruptions, and a map of the island of Hawaii.

MR. EDGAR THURSTON, Superintendent of the Government Central Museum, Madras, has printed a list of fishes obtained during a residence of three weeks at Rámeswaram Island, which is separated on the one hand from the Indian continent, and on the other from the Island of Manaar, by an interrupted ridge of rocks known as Adam's Bridge. The fish-fauna of the coral reefs of this island stands out in striking contrast with that of other places on the Madras coast. "Coral Fishes," *i.e.* brightly coloured fishes—*Chætodon*, *Platyglossus*, *Heniochus*, *Pseudoscarus*, &c.—abound round the reefs, and feed either on the small delicate marine Invertebrata which swarm on the living corals, or, if their teeth are adapted for the purpose, on the hard calcareous substance of the corals. The bright colouring of the fishes is explained by Mr. Thurston on the well-known principle that "the less the predominant colouring of any creature varies from that of its surroundings, the less will it be seen by its foes, the more easily can it steal upon its prey, and the more it is fitted for the struggle for existence." Conspicuous by their abundance are several species belonging to the family Sclerodermi, including *Balistes* (file-fish), whose jaws are armed with teeth well suited for breaking off pieces of hard coral, or boring holes into the shells of the Mollusca, on the soft parts of which they feed. The file-fishes are said to destroy an immense number of mollusks, thus becoming most injurious to the pearl-fisheries. Present, too, in great numbers are several species of the family Gymnodontes: *Tetrodons* (globe fishes), including the beautifully marked little *Tetrodon margaritiferus*, and *Diodons*, which have a very bad reputation among the natives as being very poisonous.

IT is generally supposed that the Ainos of Yezo are amongst the disappearing races of the earth, and that they are "fast dying out," as the phrase usually runs. This appears to be an error, for according to a communication on the subject in the *Japan Weekly Mail*, from Mr. Bachelor, during the past fifteen years there has been little, if any, diminution in their number, which he puts down, so far as the Island of Yezo is concerned, at from 1300 to 1600 souls. Actual detailed statistics respecting the numbers of the Ainos do not appear to be given in the Japanese censuses, but official statistics do exist for certain Aino settlements since 1871, which may be taken as an index. These show an increase of 129 persons in sixteen years, although, by a careful examination of the data, it appears that one village not included in the earlier was given in the later years. In 1871, there were 665 males, 639 females, and 260 huts; in 1886, the numbers were 691, 742, and 318 respectively. These figures, making every reasonable allowance, show at least that there is good ground for doubting whether the Ainos are dying out, in Yezo at least, as rapidly as it is the fashion to assume that they are.

THE seventh annual meeting of the members of the Sanitary Assurance Association was held at their offices, 5 Argyll Place, Regent Street, on Monday. Prof. Roger Smith presided, and expressed his satisfaction at the continued prosperity of the Association.

IN the footnote in NATURE, December 15, 1887, p. 152, second column, line 5 from foot, *for* Careton *read* Cureton.

THE additions to the Zoological Society's Gardens during the past week include a Common Boa (*Boa constrictor*) from South America, a Royal Python (*Python regius*), two West African Pythons (*Python sebæ*) from West Africa, an Indian Python (*Python molurus*) from India, presented by Mr. Leopold Field; a Griffith's Fox (*Canis griffithi*) from Persia, two Cockateels (*Calopsitta novæ-hollandiæ*) from Australia, deposited; a Pluto Monkey (*Cercopithecus pluto*) from West Africa, an Antarctic Skua (*Stercorarius antarcticus*) from the Antarctic Seas, received in exchange.